

## PATENT SPECIFICATION

(11) 1364 500

(21) Application No. 59499/71 (22) Filed 21 Dec. 1971

(23) Complete Specification filed 12 Dec. 1972

(44) Complete Specification published 21 Aug. 1974

(51) International Classification A23G 1/00

(52) Index at acceptance

A2B 15 20A

(72) Inventor PAUL ANTHONY GLYNN



## (54) A METHOD OF PRODUCING MILK CHOCOLATE

(71) We, CADBURY LIMITED, a British Company of Bournville, Birmingham, do hereby declare the invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a method of producing what is termed "milk chocolate".

10 Milk chocolate is at present prepared either from:

a) milk solids in the form of liquid milk, milk concentrates or reconstituted milk powders, using the so-called crumb process followed by a normal chocolate making procedure, or, from

15 b) milk powder using a dry mix of ingredients followed by a normal chocolate making procedure.

20 These two methods of preparing milk chocolate resulted in chocolates having different flavour characteristics, and the object of the present invention is to provide a method of manufacturing milk chocolate from normal full cream or skimmed milk powder which will result in a chocolate having the flavour characteristics of a chocolate manufactured from milk solids subjected to the crumb process.

30 The flavour characteristics associated with the use of the crumb process are usually attributed to the products arising from the so-called Maillard reaction, which occurs between the hydroxyl groups of the constituent sugars and the amino groups of the milk protein. This is often referred to as the "browning" reaction since a colour change takes place from a white to a dark brown and this colour change can be taken as a rough guide as to the degree of reaction which has occurred. This reaction has an optimum moisture content and does not easily take place in the dry state.

45 According to the present invention there is provided a method of manufacturing a milk chocolate from a milk powder comprising the steps of heating a milk powder to a temperature of not less

than 85°C and processing the heat treated milk powder with other chocolate making ingredients to form a milk chocolate. 50

Preferably, the milk powder is heated in the presence of sugar.

The sugar is preferably present in an amount of between 10% and 25% of the material subjected to the heating step. 55

Preferably also, the milk powder heating step is effected in the presence of water in an amount of up to and including 10%.

The heating can be carried out either by a batch type process using trays and a hot air oven, or by a continuous process using a band oven or the fluidised bed system. The heated milk powder mixture is subsequently used in the formulation of a milk chocolate and processed in the usual manner. 60 65

Advantageously, the heat treatment process is performed so that the milk powder does not exceed 140°C.

Most advantageously, the heat treatment is effected with a time/maximum temperature relationship which falls within the shaded area in the accompanying table. 70

In the accompanying drawings, the time relates to the total heat treatment time and the temperature relates to the maximum temperature attained by the milk powder during treatment. 75

The invention may also reside in a milk chocolate whenever manufactured by the method specified. 80

Embodiments of the present invention will now be described in the following examples.

## EXAMPLE 1

85 A full cream milk powder was combined with a sugar solution in a mixer in such a manner that the resulting mixture consisted of 80% full cream milk powder, 10% sugar and 10% water. The mixture was then spread in a layer of 1" thickness on trays which were stacked in a hot air oven capable of giving a good hot air circulation between the trays. The mixture was then heated in the oven with air at a temperature of 135°C for a period of 80 minutes during which 90 95

time it lost moisture, and developed a golden yellow brown colour. At least once during the treatment period the contents were mixed gently and respread on the trays to obtain an even heat treatment throughout the mix. The mix attained a maximum temperature of about 120°C. After heat treatment, the material was cooled to room temperature. A milk chocolate was formed in the normal way using the following ingredients:—

	Heat treated full cream milk powder	26.0%
	Sugar	45.0%
	Cocoa Mass	14.0%
15	Cocoa Butter	14.5%
	Lecithin	0.5%

The ingredients were mixed, refined, and conched in the normal manner.

#### EXAMPLE 2

The full cream milk powder was combined as in Example 1 with a sugar solution in a suitable mixer to provide a mixture consisting of 80% milk powder 10% sugar and 10% water. The mixture was then heat treated to a maximum temperature of 130°C on a batch fluidised bed using an air inlet temperature of 150°C for a period of 30 minutes, whereafter the material was allowed to cool to room temperature and used in a milk chocolate formulation as in Example 1.

#### EXAMPLE 3

The process of Example 1 was repeated using a homogeneous mixture of 90% full cream milk powder and 10% fine sugar heated for 80 minutes at 135°C. The mixture attained a maximum temperature of 120°C. The heat treated milk powder was then used in the manufacture of a milk chocolate as described in Example 1.

#### EXAMPLE 4

The process of Example 1 was repeated by heat treating full cream milk powder alone for 60 minutes at a temperature of 135°C. The powder attained a maximum temperature of 120°C. The heat treated milk powder was then used in the manufacture of a milk chocolate as described in Example 1.

#### EXAMPLE 5

The process of Example 1 was repeated using a homogeneous mixture of 90% skim milk powder and 10% water heated for 92 minutes at 135°C. The mixture attained a maximum temperature of 120°C. The heat treated milk powder was then used in the manufacture of a milk chocolate as described in Example 1.

#### EXAMPLE 6

The process of Example 1 was repeated

using a skim milk powder alone heated for 86 minutes at 135°C. The powder attained a maximum temperature of 120°C. The heat treated milk powder was then used in the manufacture of a milk chocolate as described in Example 1.

In the case of Examples 5 and 6, it will be seen that skim milk powder was employed. In order to obtain a product similar to that of Example 1, a proportion of butter fat (milk fat) is included in the formulations.

#### EXAMPLE 7

The process of Example 2 was repeated using a homogeneous mixture of 80% full cream milk powder, 10% sugar and 10% water heated for 25 minutes with an air inlet temperature of 160°C, during which time the mixture attained a maximum temperature of 130°C.

#### EXAMPLE 8

The process of Example 2 was repeated using a homogeneous mixture of 90% full cream milk powder and 10% fine sugar heated for 20 minutes with an air inlet temperature of 160°C, during which time the mixture attained a maximum temperature of 130°C.

#### EXAMPLE 9

The process of Example 2 was repeated using a homogeneous mixture of 90% full cream milk powder and 10% water heated for 25 minutes with an air inlet temperature of 160°C, during which time the mixture attained a maximum temperature of 130°C.

#### EXAMPLE 10

The process of Example 2 was repeated using a full cream milk powder alone heated for 20 minutes with an air temperature of 160°C, during which time the powder attained a maximum temperature of 130°C.

#### EXAMPLE 11

A mixture of 80% full cream milk powder, 10% sugar and 10% water was heated as in Example 1 for a period of 120 minutes at an air temperature of 100°C. The maximum temperature attained by the mixture was 85°C. The heat treated milk powder was then used in the manufacture of a milk chocolate as described in Example 1.

#### EXAMPLE 12

Full cream milk powder was heated alone as in Example 2 for a period of 90 minutes at an air temperature of 115°C. The powder attained a maximum temperature of 100°C. The heat treated milk powder was then used in the manufacture of a milk chocolate as described in Example 1.

#### EXAMPLE 13

The process of Example 1 was repeated using a mixture of 90% skim milk powder

60

65

70

75

80

85

90

95

100

105

110

115

and 10% water heat treated for a period of 120 minutes at an air temperature of 115°C. During the heat treatment process, the mixture attained a maximum temperature of 100°C.

In the above examples and appended claims the percentages are all weight percentages.

## WHAT WE CLAIM IS:—

- 10 1. A method of manufacturing a milk chocolate from a milk powder comprising the steps of heating a milk powder to a temperature of not less than 85°C and processing a heat treated milk powder with other
- 15 chocolate making ingredients to form a milk chocolate.
2. A method as claimed in Claim 1, wherein the milk powder heating step is effected in the presence of sugar.
- 20 3. A method as claimed in Claim 2, wherein the sugar is present in an amount of between 10% and 25% of the material subjected to the heating step.
4. A method as claimed in Claim 1, 2 or
- 25 3, wherein the milk powder heating step is effected in the presence of water.

5. A method as claimed in Claim 4, wherein the water present in an amount of up to and including 10% of material subjected to the heating step.

6. A method as claimed in any preceding claim, wherein the milk powder heating step is performed so that the milk powder does not exceed 140°C.

7. A method as claimed in any preceding claim, wherein the milk powder heating step is effected with a time/maximum temperature which falls within the shaded area of the accompanying table.

8. A method of manufacturing a milk chocolate from a milk powder substantially as hereinbefore described in any one of Examples 1 to 13.

9. A milk chocolate when prepared by the process claimed in any preceding claim.

MARKS & CLERK  
Lombard House,  
144, Great Charles Street,  
Birmingham, 3,  
Agents for the Applicants.

# DERWENT PUBLICATIONS LTD

1364500

COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

